



# LOW LEVEL WASTE

## What is it?

Low-level waste includes emission filters from facilities like the calciner, water from spent nuclear fuel storage basins, sludge from tanks, protective worker clothing, or contaminated equipment.

However, “low-level waste” is a confusing, and sometimes downright illogical, waste category. The name can be misleading, conjuring up images of waste that contains next-to-no radioactivity. But that’s often not the case. Low-level waste includes everything that doesn’t fall neatly into the other 3 waste categories. Kind of a “catch-all,” it’s any radioactive waste that is not spent fuel, high-level waste or transuranic waste.

Because it’s a catch-all category, types of low-level waste are diverse. Low-level waste is managed based on a combination of 3 different characteristics:

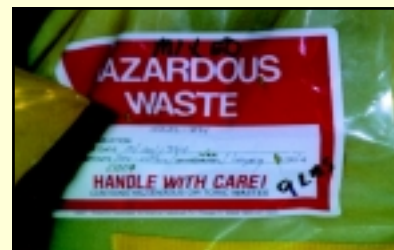
- **Hazardous Chemicals:** if the low-level waste also contains hazardous chemicals, it is “mixed” waste and must be managed to meet standards for both radioactive and hazardous waste.
- **Transuranic elements:** if the waste contains some transuranic elements, but not enough to qualify as transuranic waste, it still needs special handling to protect workers and the public from exposure to the hazards of alpha radiation, mostly inhalation and ingestion. It is called “alpha-contaminated” low-level waste.
- **Radiation dose:** if the potential dose to a person from the surface of a waste container is low enough to allow direct handling of the container, it is called “contact-handled” waste. If the potential dose is high enough to require greater protection of workers through distance and shielding, it is “remote-handled” waste.”

What makes low-level waste confusing is that these 3 characteristics can combine into different classes of low-level waste, with different risks and handling requirements. For example, low-level waste needing the most special handling requirements would be remote-handled, alpha-contaminated, mixed waste. But you could also have contact-handled, non-alpha, mixed waste.

While some low-level waste is as slightly radioactive as the name implies, some is highly radioactive in the short term. Other low-level waste remains radioactive for a long time. While most low-level waste can be disposed in shallow landfills meeting certain standards, the U.S. Nuclear Regulatory Commission requires that some “low-level” waste be placed in a geologic repository like spent nuclear fuel and “high-level” waste. If you find yourself saying, “this doesn’t make any sense,” you’ve learned a key point about the classification of low-level waste!

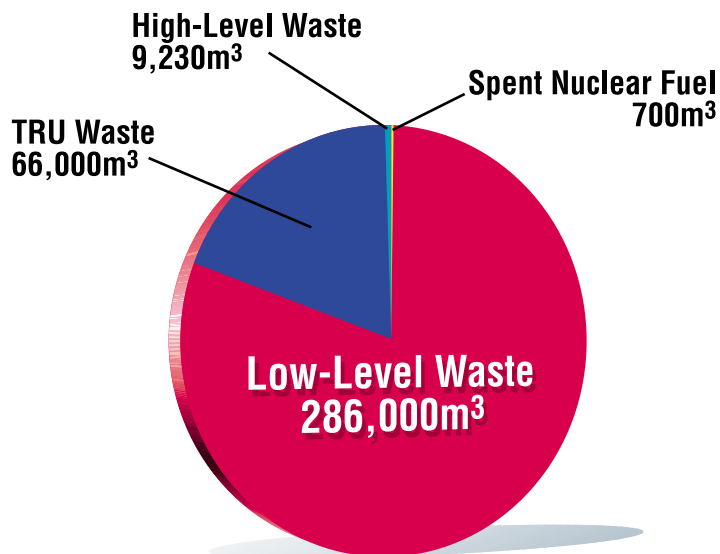
## How much is there at INEEL?

If you put all these categories together, there are about 286,000 cubic meters of low-level waste at the INEEL. That’s almost 4 times the volume of the other three waste streams combined. In addition, there is contaminated soil around the site that also qualifies as low-level waste. Agencies are still assessing the volume of contaminated soil, much of which qualifies as low-level waste, as part of the Superfund cleanup process.



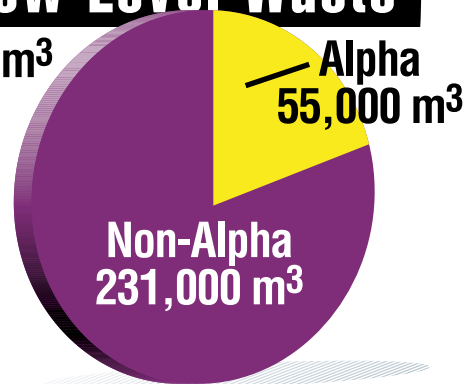
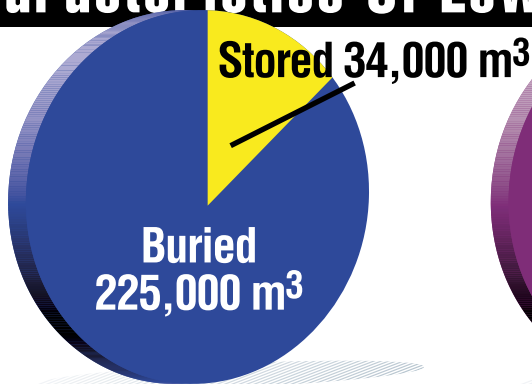
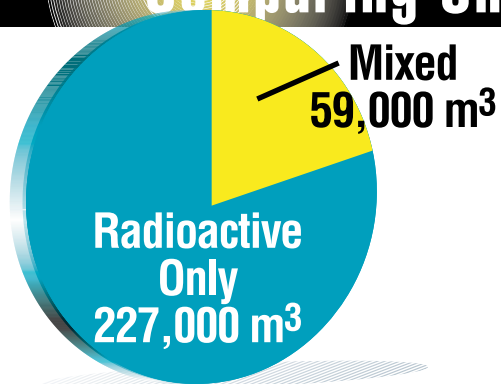
*The label on this container of mixed low-level waste tells us it is contaminated with mercury. It’s probably filters from the calciner.*

# Low-Level Waste At The INEEL

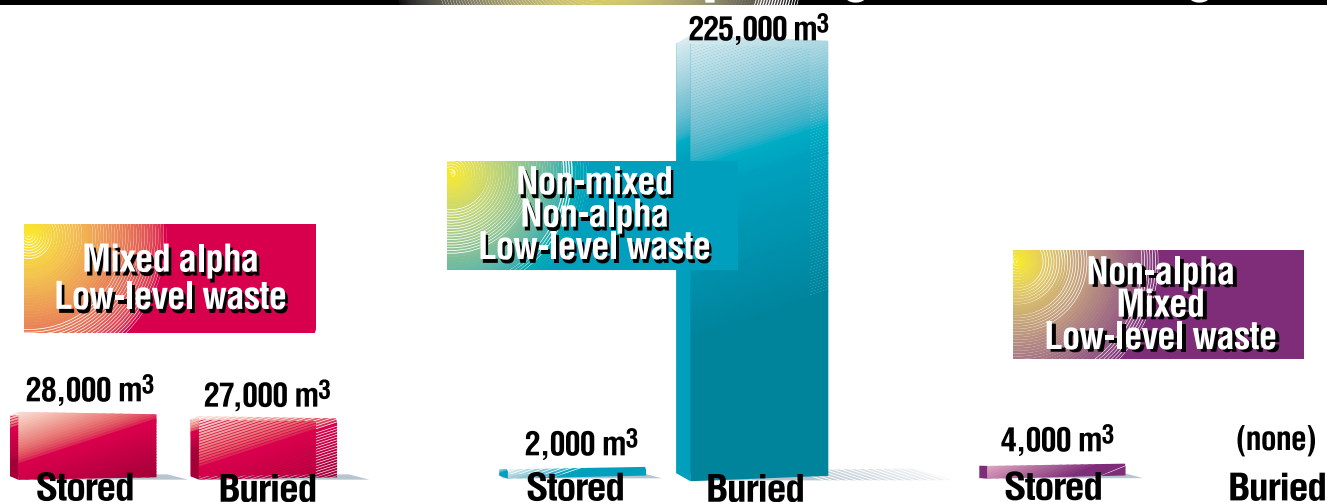


*There's four times more low-level waste at INEEL than high-level waste, spent nuclear fuel, and transuranic waste combined.*

## Comparing Characteristics Of Low-Level Waste



## Comparing Waste Categories



## Managing low-level waste at INEEL

Decisions about management of low-level waste at the INEEL are made after two factors are considered: what the waste is contaminated with, and where it came from.

The contaminant and form of the waste determines how it can be treated, packaged, and disposed of. A liquid waste is treated differently than a solid, for example, and mixed wastes are treated differently than those that are not hazardous.

Low-level waste generated during routine, ongoing site operations must follow established DOE rules. However, if the low-level waste is contaminated material being cleaned up as part of the Superfund process, DOE, EPA and Idaho's DEQ must agree on how it will be managed. Superfund cleanup gives agencies some flexibility in how waste is managed, depending on risks it presents.

## Treating low-level waste at INEEL

The INEEL treats some mixed and non-mixed low-level waste at the Waste Experimental Reduction Facility (WERF). The WERF can chop (or "size") the waste into smaller, more manageable pieces or compact it. Until recently, DOE also incinerated waste at WERF.

The Advanced Mixed Waste Treatment Project now under construction will be able to sort, size, repackage and compact both mixed transuranic waste and mixed alpha-contaminated low-level waste that contains smaller amounts of plutonium and americium. DOE is still determining how it will treat transuranic and mixed low-level waste that contains PCBs and certain organic chemicals.

## Disposing of wastes from site operations

DOE disposes of non-mixed, non-alpha contaminated, low-level waste from ongoing operations across the INEEL at the Radioactive Waste Management Complex. Waste that can be handled by direct contact is placed in a landfill called the Active Pit. Remote-handled waste is disposed of in concrete vaults.

INEEL will continue to dispose of INEEL-generated low-level waste while the RWMC remains open. RWMC is currently scheduled to close in 2006, with one exception. Some remote-handled LLW generated by the Naval Nuclear Propulsion Program's operations at the INEEL can be disposed of at the RWMC through 2008.

When it closes the RWMC, DOE will design a cover for the landfill to prevent water, animals or humans from getting into the pit. Approximately 225,000 cubic meters of low-level waste have been disposed on the INEEL.

DOE recently issued a Record of Decision concerning low-level (LLW) and mixed low-level waste (MLLW) treatment and disposal. The decision set up "regional" disposal sites for wastes generated as part of ongoing DOE operations across the country.



*Waste isn't just tossed into RWMC any more. It's packed in barrels or boxes, and careful records are kept. Only low-level wastes are disposed of at RWMC now, and only those low-level wastes generated during routine site operations.*

*RWMC will operate until 2006, with an exception for certain Navy wastes, which can be disposed of until 2008.*



*The packaging helps containers stand up to weight above it.*



*This absorbent material, like kitty litter (it might actually be kitty litter,) surrounds a container of liquid waste. If the waste leaked, it would be absorbed by the kitty litter, then contained by the plastic bag and the drum.*



Label on a container of waste. CERCLA is an abbreviation for the law that created Superfund, the Comprehensive Environmental Response, Compensation, and Liability Act. D009 is the waste code for mercury.

Factors considered in deciding how low-level waste will be treated and disposed include how the waste was created, or "generated."

Management plans for waste created during cleanup, like that shown in the photo below, must be agreed upon by the state, EPA, and DOE. Plans are also subject to public review and comment.



DOE designated the Hanford, Washington and the Nevada Test Site as mixed low-level and non-mixed low-level waste disposal facilities for all of the facilities in the DOE complex. DOE plans to send INEEL mixed low-level waste—and after 2006, non-mixed low-level waste—to these sites. DOE can also continue to use commercial treatment and disposal facilities.

## Limits on waste from other places

The Site Treatment Plan gives the Idaho Department of Environmental Quality approval authority over incoming mixed low-level waste. DEQ typically requires that waste approved for shipment to INEEL treatment facilities be treated and removed within one year.

## Waste from Superfund cleanup

Under the 1991 Superfund agreement, EPA, Idaho's DEQ and DOE will decide what to do with the low-level and alpha-contaminated mixed low-level waste located around the INEEL due to spills, leaks, and airborne contamination.

Much of this waste is contaminated soil. This waste is evaluated on a case-by-case basis. Depending on how much risk the soil presents, it may be:

- Placed in new landfill near INTEC constructed for cleanup soils.
- Left in place.
- Treated or capped in place to reduce risks to an acceptable level.
- Dug up, treated and shipped off-site for disposal.

## What about "buried waste?"



The INEEL's Radioactive Waste Management Complex includes an 88-acre landfill. One area contains acid waste, another salt waste.

DOE still disposes of some types of low-level waste that do not contain chemicals in the landfill, and plans to stop when current cells are filled in 2006.

The term "buried waste," however, usually refers to plutonium-contaminated waste that was buried in some of the landfill's pits and trenches (roughly 10 to 12 acres) before 1970. Most of this waste came from the weapons production facility at Rocky Flats, Colorado. Cleanup of this "buried waste" remains a top priority for the State.